DIALOG(R)File 352:Derwent WPI

012624503

WPI Acc No: 1999-430607/199936

XRAM Acc No: C99-126977

XRPX Acc No: N99-320588

Thermoplastic elastomer composition for pneumatic tires and hoses

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Number of Countries: 021 Number of Patents: 011

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 9936471	A1	19990722	WO 99JP19	A	19990107	199936 B
JP 11199713	A	19990727	JP 985028	A	19980113	199940
EP 969039	A1	20000105	EP 99900135	A	19990107	200006
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			US 2001800782	A	20010308	

Priority Applications (No Type Date): JP 98333922 A 19981125; JP 985028 A 19980113; JP 98235386 A 19980821

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
WO 9936471	A1	J	54	C08L-019/00	
Designated States (National): KR US					
Designated States (Regional): AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE					
JP 11199713	A		8	C08L-019/00	
EP 969039	A1	E			Based on patent WO 9936471
Designated States (Regional): DE FR					
JP 2999188	B1		8	C08L-021/00	
JP 2000063572	A		9	C08L-021/00	
JP 2000159936	A		8	C08L-021/00	
KR 2000076174	A			C08L-019/00	Based on patent WO 9936471
US 20010018492	A1			C08L-077/00	Div ex application WO 99JP19 Div ex application US 99380588
JP 3236257	B2		8	C08L-019/00	Previous Publ. patent JP 11199713
US 6359071	B1			C08L-077/00	Based on patent WO 9936471
US 6538066	B2			C08L-047/00	Div ex application WO 99JP19 Div ex application US 99380588 Div ex patent US 6359071

Abstract (Basic): WO 9936471 A1

NOVELTY - A thermoplastic elastomer composition comprises an elastomer component containing a halogenated isobutylene-para-methylstyrene copolymer and a Nylon resin with 170-230 degreesC m.pt., and has been dynamically vulcanized to have 50-95% gel content.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a production process for the composition, comprising pre-kneading a cross-linking agent for the elastomer component into it.

USE - For pneumatic tires (claimed); in particular, as tire inner liners for preventing air permeation; and for hoses (claimed) and belts.

ADVANTAGE - The composition has high rubber content with reduced dia. of rubber domains, and has excellent heat resistance, durability and air permeation prevention, while maintaining flexibility. In particular, the durability is markedly improved at 10, 0, -20 and -40 degreesC. The tires, hoses and belts have excellent low-temperature stretching and bending fatigue properties.

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Technology Focus:

TECHNOLOGY FOCUS - POLYMERS - Preferred materials: The Nylon resin comprises Nylon 11 or Nylon 12 and Nylon 6/66 copolymer, in a ratio of 10/90 - 90/10, and with less than 10 mol. wt. distribution width (Mw/Mn). The elastomer component in (A') is at least one from diene rubbers and their hydrogenated products. The thermoplastic resin component in (B') is at least one from polyamide, polyester, polynitrile, polymethacrylate, polyvinyl, cellulose, fluoro- and imide resins. (B') is a blend of at least 2 polyamide resins. (C') and (D') are polyamide resins with at least 7 methylenes per amide.

Preferred method: A rubber composition (A) and a thermoplastic resin (B) are kneaded under the conditions of formulae (I) and (II), to give a composition (C), which is then kneaded with a rubber composition (D) under the conditions of formulae (III) and (IV).

(phiA/phiB) x (etaB/etaA) less than 1.0 (I)

0.8 less than (etaA/etaB) less than 1.2 (II)

(phiD/phiC) x (etaC/etaD) less than 1.0 (III)

0.8 less than (etaC/etaD) less than 1.2 (IV)

phiA, phiB, phiC, phiD=vol. fraction of (A), (B), (C), (D), respectively;

etaA, etaB, etaC, etaD=melt viscosity of (A), (B), (C), (D), respectively.

Preferred composition: The composition comprises a dispersed phase elastomer composition (A') with at most 10 microns particle dia. and as a matrix, a thermoplastic resin composition (B') which is a blend of at least 2 thermoplastic resins; and the particle dia. of resin composition (D') dispersed in the matrix resin composition (C') in (B') is smaller than the dispersed rubber particle dia. (A'), (B'), (C') and (D') satisfy formulae (V)-(VIII).

(phid/phim) x (etam/etad) less than 1.0 (V)

0.8 less than (etam/etad) less than 1.2 (VI)

(phiD'/phiC') x (etaC'/etaD') less than 1.0 (VII)

0.8 less than (etaC'/etaD') less than 1.2 (VIII)

phid, phim, phiC', phiD'=vol. fraction of (A'), (B'), (C'), (D'), respectively;

etad, etam, etaC', etaD'=melt viscosity of (A'), (B'), (C'), (D'), respectively.

Title Terms: THERMOPLASTIC; ELASTOMER; COMPOSITION; PNEUMATIC; HOSE

Derwent Class: A18; A23; A32; A88; A95; Q11; Q67

International Patent Class (Main): C08L-019/00; C08L-021/00; C08L-047/00; C08L-077/00

International Patent Class (Additional): B29D-023/00; B29D-030/06; B60C-001/00; B60C-005/00; B60C-005/14; C08F-008/00; C08J-003/24; C08L-023/22; C08L-023/28; C08L-025/16; C08L-101/00; F16L-011/04

File Segment: CPI; EngPI

Manual Codes (CPI/A-N): A05-F01E; A07-A04E; A10-E04A; A11-C02A; A12-H01; A12-H02; A12-T01

Polymer Indexing (PS):

<01>

001 018; R00966 G0055 G0044 G0033 G0022 D01 D02 D12 D10 D51 D53 D58 D84 ; R01417 G0113 G0102 G0022 D01 D02 D11 D10 D12 D19 D18 D31 D51 D53 D58 D76 D89; H0135 H0124; L9999 L2391; L9999 L2073; M9999 M2073; S9999 S1661; S9999 S1365; H0022 H0011; M9999 M2233 M2222; S9999 S1547 S1536; P1150 ; P1741

002 018; ND04; ND01; K9745-R; N9999 N6439; B9999 B3418-R B3372; B9999 B4682 B4568; B9999 B5287 B5276; B9999 B4035 B3930 B3838 B3747; B9999 B4875 B4853 B4740; Q9999 Q7909 Q7885; Q9999 Q9256-R Q9212; B9999 B3178; K9665; B9999 B3918 B3838 B3747; B9999 B3930-R B3838 B3747; B9999 B3612 B3554; N9999 N5812-R; N9999 N6597 N6586; N9999 N5970-R; B9999 B5243-R B4740; B9999 B4080 B3930 B3838 B3747; B9999 B5094 B4977 B4740; B9999 B5118 B5107 B4977 B4740; Q9999 Q8719-R; Q9999 Q8731 Q8719

003 018; Br 7A; H0157

<02>

001 018; P0668 P1934 P0635 F70 D01 D11 D10 D50 D91; S9999 S1661; S9999 S1547 S1536; H0135 H0124; L9999 L2391; L9999 L2073; M9999 M2073; S9999 S1365; H0317

002 018; P0726 P1934 P0635 F70 D01 D11 D10 D50 E13 E00; S9999 S1661; S9999 S1547 S1536; H0135 H0124; L9999 L2391; L9999 L2073; M9999 M2073; S9999 S1365; H0317

003 018; H0317; H0135 H0124; L9999 L2391; L9999 L2073; M9999 M2073; S9999 S1365; S9999 S1547 S1536; S9999 S1661; P0839-R F41 D01 D63

004 018; H0317; H0135 H0124; L9999 L2391; L9999 L2073; M9999 M2073; S9999 S1365; S9999 S1547 S1536; S9999 S1661; P0500 F- 7A

005 018; G0384-R G0339 G0260 G0022 D01 D12 D10 D26 D51 D53 D58 D63 F41 F89; H0317; H0135 H0124; L9999 L2391; L9999 L2073; M9999 M2073; S9999 S1365; S9999 S1547 S1536; S9999 S1661; P0088-R; H0000; H0011-R

006 018; R01852-R G3634 D01 D03 D11 D10 D23 D22 D31 D42 D50 D76 D86 F24 F29 F26 F34 H0293 P0599 G3623; H0317; H0135 H0124; L9999 L2391; L9999 L2073; M9999 M2073; S9999 S1365; S9999 S1547 S1536; S9999 S1661

007 018; H0317; H0135 H0124; L9999 L2391; L9999 L2073; M9999 M2073; S9999 S1365; S9999 S1547 S1536; S9999 S1661; P1081-R F72 D01; P0077 ; H0293

008 018; G0475-R G0260 G0022 D01 D12 D10 D26 D51 D53 F12; H0317; H0135 H0124; L9999 L2391; L9999 L2073; M9999 M2073; S9999 S1365; S9999 S1547 S1536; S9999 S1661; H0000; H0011-R; P0088

009 018; ND04; ND01; K9745-R; N9999 N6439; B9999 B3418-R B3372; B9999 B4682 B4568; B9999 B5287 B5276; B9999 B4035 B3930 B3838 B3747; B9999 B4875 B4853 B4740; Q9999 Q7909 Q7885; Q9999 Q9256-R Q9212; B9999 B3178; K9665; B9999 B3918 B3838 B3747; B9999 B3930-R B3838 B3747; B9999 B3612 B3554; N9999 N5812-R; N9999 N6597 N6586; N9999 N5970-R; B9999 B5243-R B4740; B9999 B4080 B3930 B3838 B3747; B9999 B5094 B4977 B4740; B9999 B5118 B5107 B4977 B4740; Q9999 Q8719-R; Q9999 Q8731 Q8719

010 018; B9999 B5607 B5572